5.11 TRAFFIC AND TRANSPORTATION

This section addresses the impacts associated with traffic and transportation for the proposed PEF Expansion. The environmental consequences of developing the PEF Expansion are also discussed, along with the Applicant's proposal to apply the applicable Conditions of Certification for the PEF to the PEF Expansion.

The PEF Expansion consists of a nominal 160 MW simple cycle combustion turbine generator. The PEF Expansion area will be approximately two acres located entirely within the existing PEF 31-acre site boundary. The PEF Expansion requires no modification to the existing PEF offsite linear facilities (e.g., electric transmission line, fuel gas supply line, or water supply line). The PEF Expansion will use the existing PEF administration and control, warehouse and shop, and water treatment buildings. Site access and onsite roadways are common with the existing PEF. Figure 3.1-1 of this application depicts the new facilities required for the PEF Expansion project within the footprint of the existing PEF.

5.11.1 Affected Environment

The affected environment as it pertains to Traffic and Transportation is described in 99-AFC-7 and is applicable for the PEF Expansion project. Section 5.11 of 99-AFC-7 is included for reference in Attachment J of this application.

5.11.2 Environmental Consequences

Impacts associated with the construction and operation traffic associated with the new 160 MW turbine are described below, and the traffic and transportation impacts from 99-AFC-7 are included in Attachment J of this application.

For purposes of the PEF Expansion analysis, it is assumed that all workers would meet at the plant site. Construction activities associated with the PEF Expansion will last approximately twelve months and will not conflict with the existing and newly complete PEF construction because PEF construction activities will be completed prior to starting construction on the PEF Expansion project.

Construction of the PEF Expansion project will require a total construction workforce of 146 workers on average, assuming a single shift and a 40-hour workweek. Of the 146 workers, approximately 30 will be field staff. Based on Calpine's experience during the construction of the existing PEF, about 15 of the field staff are expected to commute from a non-local region (refer to Section 5.10.2.2, Socioeconomics of this application). During the peak construction period (in the 7th month after the Notice-To-Proceed) an estimated

225 construction workers will be required for PEF Expansion. Of the 225 workers, 210 are assumed to be local workers and the remaining 15 will make up the non-local workforce. Construction of the PEF Expansion project could result in a total of approximately 146 vehicle trips per day on average, and about 225 vehicle trips per day during the peak construction period. The distribution of the workforce is therefore based on these numbers, and vehicle trips were calculated based on this data. Refer to Tables 5.11-1a and 5.11-1b for specific information on plant construction workforce distribution and vehicle trip generation.

5.11.2.1 Impacts of Workforce Traffic on Highways

Using the travel pattern assumptions described above, Table 5.11-2 (Distribution of Plant Construction-Related Traffic on Highways) presents the increased traffic on local highways as a result of the construction workforce commuting to and from the project site. During the peak construction period (estimated to be the 7th month following the Notice-To-Proceed), construction-related vehicle traffic will affect Highways 99 and 223 the most, resulting in traffic increases of 0.1 to 2.6 percent along portions of these highways. The highest peak increase in traffic associated with construction of PEF Expansion project is a 2.6 percent increase along Highway 223. The PEF Expansion project is not anticipated to reduce the existing level of service (LOS) on any of the highways in the project area. In addition, these traffic increases would be short-term, occurring only during the peak construction period. Construction workforce traffic would generally occur between 6:00 a.m. and 7:00 a.m. in the morning, and again between 4:00 p.m. and 5:00 p.m. in the evening.

5.11.2.2 Impacts of Workforce Traffic on Local Roads

The two-lane, privately owned road (Edmonston Pump Plant Road) that provides access to the project site will be most affected by construction workforce traffic commuting to and from the project site. These impacts are presented in Table 5.11-3 (Distribution of Plant Construction-Related Traffic on Local Roads).

During the peak construction period for the PEF Expansion project, traffic on Edmonston Pump Plant Road east of Interstate 5 will increase by 450 vehicle trips/day, resulting in a traffic increase of 62 percent. On average, construction-related traffic generated by the workforce along Edmonston Pump Plant Road east of Interstate 5 will result in an additional 292 vehicle trips per day, an increase of 40 percent over conditions prior to construction of the existing PEF. Traffic increases will be most apparent during the morning and evening peak commute hours between 6:00 a.m. and 7:00 a.m., and again between 4:00 p.m. and 5:00 p.m. each day. These increases would be short-term, occurring only during the peak construction period.

TABLE 5.11-1a
PLANT CONSTRUCTION WORKFORCE DISTRIBUTION
PEF EXPANSION

Origin of Vehicle Travel to PEF Site	Distribution of Workforce (Local/Non-Local)	Avg Local Workforce	Peak Local Workforce	Avg Non-Local Workforce	Peak Non-Local Workforce	Total Average Workforce[1]	Total Peak Workforce[2]
		PEF Exp	PEF Exp	PEF Exp	PEF Exp	PEF Exp	PEF Exp
Bakersfield	69%	90	145	10	10	100	155
Delano	11%	14	23	2	2	16	25
Wasco	6%	8	13	1	1	10	14
Arvin	4%	5	8	1	1	6	9
McFarland	3%	4	6	0	0	4	7
Shafter	3%	4	6	0	0	4	7
Taft & Maricopa	2%	3	4	0	0	3	5
Other Areas of Kern County (including Tehachapi) and Southern California	2%	3	4	0	0	3	5
Total (Monthly):	100%	131	210	15	15	146	225
Duration of Construction:		12	12	12	12	12	12
Total (Over Duration of Construction):		1,536	2,520	180	180	1,716	2,700

Includes plant site workers, plus offsite workers (all of whom are assumed to drive to the plant site each day, prior to disbursing to off-site locations).

[1] Sum of average local workforce and average non-local workforce.

[2] Sum of total peak local workforce and total peak non-local workforce.

The above numerical estimates are based on the following:

Total (Monthly) = [Total (Over Duration of Construction)] ÷ (Duration of Construction)

Avg Local Workforce = [Total (Monthly), Avg Local Workforce] x [% Distribution of Workforce (Local/Non-Local)]

Peak Local Workforce = [Total (Monthly), Peak Local Workforce] x [% Distribution of Workforce (Local/Non-Local)]

Avg Non-Local Workforce = [Total (Monthly), Avg Non-Local Workforce] x [% Distribution of Workforce (Local/Non-Local)]

Peak Non-Local Workforce = [Total (Monthly), Peak Non-Local Workforce] x [% Distribution of Workforce (Local/Non-Local)]

Total Avg Workforce (Over Duration of Construction) = [Avg Local Workforce (Over Duration of Construction)] + [Avg Non-Local Workforce (Over Duration of Construction)]

Total Peak Workforce (Over Duration of Construction) = [Peak Local Workforce (Over Duration of Construction)] + [Peak Non-Local Workforce (Over Duration of Construction)]

TABLE 5.11-1b
PLANT CONSTRUCTION VEHICLE TRIP GENERATION AND WORKFORCE DISTRIBUTION PEF EXPANSION

Origin of Vehicle Travel to PEF Site	Distribution of Workforce (Local/Non-Local)	Total Average Workforce[1]	Total Average Vehicle Trips	Total Peak Workforce[2]
		PEF Exp	PEF Exp	PEF Exp
Bakersfield	69%	100	202	155
Delano	11%	16	32	25
Wasco	6%	10	17	14
Arvin	4%	6	11	9
McFarland	3%	4	9	7
Shafter	3%	4	9	7
Taft & Maricopa	2%	3	6	5
Other Areas of Kern County (including Tehachapi) and Southern California	2%	3	6	5
Total (Monthly):	100%	146	292	225
Duration of Construction:		12	12	12

Includes plant site workers, plus offsite workers (all of whom are assumed to drive to the plant site each day, prior to disbursing to off-site locations).

1 See Table 5.11-3a, Total Average Workforce.

2 See Table 5.11-3a, Total Peak Workforce.

The above numerical estimates are based on the following:

Total Average Vehicle Trips = (Total Average Workforce) x (2 Vehicle Trips Per Day)

Total Peak Vehicle Trips = (Total Peak Workforce) x (2 Vehicle Trips Per Day)

TABLE 5.11-2
DISTRIBUTION OF PLANT CONSTRUCTION-RELATED TRAFFIC ON HIGHWAYS
PEF EXPANSION

Highway / Roadway	Segment	Existing AADT	Existing LOS	Note	Distribution of Workforce (Local & Non-Local)	Projected Peak Vehicle Trips/Day	Peak Increase (%)	Projected Peak LOS	Projected Average Vehicle Trips/Day	Average Increase (%)
Interstate 5										
	@ jct Hwy 99 North	67,000	A	1	100%	450	0.7%	A	292	0.4%
	@ jct Hwy 166	29,500	C	4	2%	9	0.0%	C	6	0.0%
	@ jct Hwy 223	29,500	C	3	9%	41	0.1%	C	26	0.1%
	@ jct Hwy 119	29,500	C	3	9%	41	0.1%	C	26	0.1%
	@ jct Hwy 43	30,500	C	3	9%	41	0.1%	C	26	0.1%
	@ jct Hwy 58	33,000	C	3	9%	41	0.1%	C	26	0.1%
Highway 33										
	@ jct Hwy 166-East	4,300	C	4	2%	9	0.2%	C	6	0.1%
	@ jct Hwy 119-East	8,500	D	4	2%	9	0.1%	D	6	0.1%
Highway 43										
	@ jct I-5	4,100	B	3	9%	41	1.0%	B	26	0.6%
	@ jct Hwy 58- E. Rosedale Hwy	9,600	B	3	9%	41	0.4%	B	26	0.3%
	@ jct Hwy 58- W. McKittrick Hwy	2,650	A	3	9%	41	1.5%	A	26	1.0%
	@ jct Hwy 46-West	7,200	C	5	6%	27	0.4%	C	17	0.2%
	@ jct Hwy 46-East	3,600	B	5	6%	27	0.8%	B	17	0.5%

TABLE 5.11-2 (CONTINUED)
DISTRIBUTION OF PLANT CONSTRUCTION-RELATED TRAFFIC ON HIGHWAYS
PEF EXPANSION

Highway / Roadway	Segment	Existing AADT	Existing LOS	Note	Distribution of Workforce (Local & Non-Local)	Projected Peak Vehicle Trips/Day	Peak Increase (%)	Projected Peak LOS	Projected Average Vehicle Trips/Day	Average Increase (%)
Highway 58										
	@ jct Hwy 223-West	20,600	B	6	2%	9	0.0%	B	6	0.0%
	@ jct Hwy 202	20,900	B	6	2%	9	0.0%	B	6	0.0%
Highway 99										
	@ jct I-5	35,500	B	2	100%	450	1.3%	B	292	0.8%
	@ jct Hwy 166	36,000	B	7	85%	383	1.1%	B	243	0.7%
	@ jct Hwy 223	38,000	B	7	85%	383	1.0%	B	243	0.6%
	@ jct Hwy 119	41,500	B	8	83%	374	0.9%	B	237	0.6%
	@ jct Hwy 58-East	137,000	C	8	83%	374	0.3%	C	237	0.2%
	@ jct Hwy 58-West	101,000	D	8	83%	374	0.4%	D	237	0.2%
	@ jct Hwy 204	95,000	C	8	83%	374	0.4%	C	237	0.2%
	@ jct Hwy 65	90,000	C	8	83%	374	0.4%	C	237	0.3%
	@ jct Hwy 46	51,000	B	9	14%	63	0.1%	B	40	0.1%
	@ jct Hwy 155	42,000	B	10	11%	50	0.1%	B	31	0.1%
Highway 166										
	@ jct Hwy 33 North	4,600	C	3	9%	41	0.9%	C	26	0.6%
	@ jct I-5	3,700	B	3	9%	41	1.1%	B	26	0.7%

TABLE 5.11-2 (CONTINUED)
DISTRIBUTION OF PLANT CONSTRUCTION-RELATED TRAFFIC ON HIGHWAYS
PEF EXPANSION

Highway / Roadway	Segment	Existing AADT	Existing LOS	Note	Distribution of Workforce (Local & Non-Local)	Projected Peak Vehicle Trips/Day	Peak Increase (%)	Projected Peak LOS	Projected Average Vehicle Trips/Day	Average Increase (%)
Highway 223										
	@ jct I-5	1,050	A	11	6%	27	2.6%	A	17	1.6%
	@ jct Hwy 58	1,550	B	11	6%	27	1.7%	B	17	1.1%
Total (Monthly):						450			292	

Notes:
(1) See Table 5.11-1.
(2) Assumes traffic from all directions.
(3) Assumes traffic from Shafter and Wasco.
(4) Assumes traffic from other areas of Kern County (including Taft and Maricopa).
(5) Assumes traffic from Wasco only.
(6) Assumes traffic from other areas of Southern California and Tehachapi.
(7) Assumes traffic from Bakersfield, Delano, McFarland, and other areas of Kern County.
(8) Assumes traffic from Bakersfield, Delano, and McFarland.
(9) Assumes traffic from Delano and McFarland.
(10) Assumes traffic from Delano only.
(11) Assumes traffic from Arvin and other areas of Southern California and Tehachapi.
Projected LOS estimate based on percentage peak increase. LOS calculations not available from Caltrans.

The above numerical estimates are based on the following:

Projected Peak Vehicle Trips/Day = [Total (Monthly), Projected Peak Vehicle Trips/Day] x [% Distribution of Workforce (Local & Non-Local)]

Projected Average Vehicle Trips/Day = [Total (Monthly), Projected Average Vehicle Trips/Day] x [% Distribution of Workforce (Local & Non-Local)]

Peak Increase (%) = Projected Peak Vehicle Trips/Day ÷ Existing AADT

Average Increase (%) = Projected Average Vehicle Trips/Day ÷ Existing AADT

TABLE 5.11-3
DISTRIBUTION OF PLANT CONSTRUCTION-RELATED TRAFFIC ON LOCAL ROADS

Local Road	Existing AADT	Projected Peak Vehicle Trips/Day	Peak Increase (%)	Projected Average Vehicle Trips/Day	Average Increase (%)
Edmonston Pump Plant Road	720	450[1]	62%	292[1]	40%

[1] Assumes traffic from all directions.

As shown in Table 5.11-2 from Section 5.11 of 99-AFC-7, Edmonston Pump Plant Road has a capacity of 9,000 vehicles per day. The existing average daily traffic on this private road is nearly negligible, therefore the road will be able to handle the 450 peak construction vehicle trips/day and 292 average trips/day without reducing its LOS to a significantly adverse level (i.e., LOS E or F). Thus the peak-period traffic increases estimated above will still be far below the capacity of Edmonston Pump Plant Road and will not result in a significant adverse traffic impact. However, construction-related traffic increases will be mitigated to the extent feasible through the use of traffic mitigation presented in Section 5.11.3 of 99-AFC-7 (refer to Attachment J of this application).

5.11.2.3 Construction Equipment and Material Deliveries

Construction of the PEF Expansion will require the use and installation of heavy machinery and associated systems and structures. Heavy equipment will be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, and cement mixers.

In addition to deliveries of heavy equipment, construction materials such as concrete, wire, pipe, cable, fuels, reinforcing steel, and consumables will be delivered to the site by truck. The PEF Expansion would result in an increase of 269 truck deliveries to the plant site over 12 months. Deliveries will include hazardous materials to be used during project construction, as described in Section 5.15, Hazardous Materials Handling. Deliveries will occur between 7:00 a.m. and 5:00 p.m. on weekdays. It is assumed that the majority of these materials will be transported from either the Bakersfield or Los Angeles areas.

5.11.2.4 Transport of Heavy Equipment and Machinery

In order to minimize truck transport traffic, rail lines will be used (whenever possible and cost effective) to transport heavy equipment and machinery as identified in Table 3.8-2. The

Union Pacific and Southern Pacific Company Railroad Arvin Branch is the preferred rail line to transport heavy equipment and machinery. The details for the shipment and transport of cargo by rail, particularly large construction machinery, remain unchanged from 99-AFC-7 (refer to Attachment J of this application).

5.11.2.5 Distribution of Truck Traffic and Routes of Travel

It is assumed that about 70 percent of the truck deliveries would originate in Bakersfield and that drivers will utilize Highway 99 south to Interstate 5 south to the plant site. About 20 percent of the deliveries are assumed to originate from the Los Angeles area; drivers will use Interstate 5 north to the site. The remaining truck deliveries will originate north of Bakersfield, and will travel via Highway 43 south to Interstate 5 to the site, or Interstate 5 south to the site.

5.11.2.6 Impacts of Truck Traffic on Highways and Local Roads

Tables 5.11-4 and 5.11-5 illustrates the impact of the construction truck traffic on the local highways roads and compares the construction-related truck traffic traveling to the generating plant site to existing automobile and truck traffic on highway routes. The average influx of 1 truck per day for the PEF Expansion project will have a negligible effect when compared to existing truck traffic on these highways, and will represent a negligible increase (0.00001 to 0.0008 percent) in truck traffic along the proposed routes of travel. Therefore, the impact of construction-related truck traffic on highways will not be significant.

The distribution of plant construction-related truck traffic on the Edmonston Pump Plant Road is shown on Table 5.11-4.

5.11.2.7 Cumulative Impacts

Cumulative traffic impacts from construction of the PEF Expansion will be similar to or less than those from construction of the existing PEF project. Operational cumulative traffic from the PEF and PEF Expansion can easily be accommodated by the existing highway and roadway system. No impacts from plant operation traffic are anticipated at the Laval Road exit/entrance to Interstate 5, since plant workers will be arriving at the site using the Interstate 5 to the Edmonston Pump Plant Road exit. Therefore, no significant cumulative traffic impacts are expected.

5.11.3 Mitigation Measures

The Applicant proposes to apply the existing Conditions of Certification for the PEF to the PEF Expansion. These conditions are included for reference in Section 9.0 of this application.

TABLE 5.11-4
DISTRIBUTION OF PLANT CONSTRUCTION-RELATED TRUCK TRAFFIC ON HIGHWAYS

Highway	Existing AADT	Existing Truck AADT	Project Average Truck Trips/Day[1]	Average Increase (%)
Interstate 5				
@ Grapevine	67,000	17,002	0.2[(2)]	0.00001
@ Jct. Hwy 99				
	67,000	18,200	0.4[(4)]	0.00002
@ Jct. Hwy 58	33,000	10,230	0.4[(4)]	0.00002
Highway 99				
@ Jct. Hwy 5	35,500	8,875	0.7[(4)]	0.00007
@ Jct. Hwy 223	38,000	9,500	0.1[(3),]	0.00001
Highway 43				
@ Jct. Hwy 5	4,100	1,025	0.8[(3), (4)]	0.0008

1 Assumes an average of 20 truck deliveries each month, generating approximately 1 truck delivery per day, i.e., 2 trips/day on average during construction period.

2 20% from Los Angeles area using I-5 north to project site.

3 10% from north of Bakersfield using Highway 43 south to the I-5 to the site or the I-5 south to the site.

4 Assumes 70% deliveries from Bakersfield using Highway 58 west to Highway 33 south.

TABLE 5.11-5
DISTRIBUTION OF PLANT CONSTRUCTION-RELATED TRUCK TRAFFIC ON LOCAL ROADS

Local Road	Existing AADT	Project Average Truck Trips/Day	Average Increase (%)
Edmonston Pump Plant Road	720	1	Negligible

With the implementation of these Conditions of Certification, no significant unavoidable traffic and transportation adverse impacts are anticipated to occur from construction or operation of the PEF Expansion.

5.11.4 LORS Compliance

The PEF Expansion will comply with all applicable LORS related to traffic and transportation. A complete list of the applicable LORS for traffic and transportation is included in Section 7.0 of this application.

5.11.5 References

The traffic and transportation references for the existing PEF are applicable to the PEF Expansion. The references from Section 5.11 of 99-AFC-7 are included as part of Attachment J of this application.